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GROUP OF RAPPORTEURS

REPORT OF THE GROUP OF RAPPORTEURS ON ITS THIRTY-FOURTH SESSION (10-14 March 1986)

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REPORT

1. The Group of Rapporteurs of the Committee of Experts on the Transport of Dangerous Goods held its thirty-fourth session from 10 to 14 March 1986. Rapporteurs from the following countries took part in the work of the Group: France; Germany, Federal Republic of; Italy; Japan; Norway; Union of Soviet Socialist Republics; United Kingdom; United States of America. Observers from the Netherlands, Sweden and Switzerland were invited to participate in accordance with rule 72 of the Rules of Procedure of the Economic and Social Council. A representative was present from the following specialized agency: International Maritime Organization (IMO). The intergovernmental organization, the Central Office for International Railway Transport (OCTI) was represented. Experts from the International Air Transport Association (IATA), the International Chamber of Shipping (ICS), the European Syndicate on Steel Drums (SEFA); the Hazardous Materials Advisory Council (HMAC), the European Council of Chemical Manufacturer's Federations (CEFIC), the European Association of Reconditioners and Dealers in Drums (SERRED) and the European Nitrogen Producers Association (APEA), were invited to participate in those items of the agenda that were of concern to their Organizations.

ADOPTION OF THE AGENDA

2. The Group of Rapporteurs adopted the provisional agenda prepared by the secretariat (ST/SG/AC.10/C.2/22).

ELECTION OF OFFICERS

3. On the proposal of the rapporteur from the United Kingdom supported by the rapporteur from the United States of America, Mr. J. Engeland (Federal Republic of Germany) was unanimously elected Chairman and on the proposal of the rapporteur from the United States of America, Mr. L. Grainger (United Kingdom) was unanimously elected Vice-Chairman.

GENERAL

4. A member of the secretariat made reference to the current austerity situation with the United Nations Organization and certain difficulties resulting from that situation, in particular, as regards documentation and its translation. It was agreed that this would be taken into consideration when discussing the future programme of work.

5. A timetable was agreed, the working group on Organic Peroxides adjured to concentrate on tests and criteria. A working group on listing and classification was also organized.

6. A short video film on testing Division 5.1 substances was presented by the observer from the Netherlands.

TESTS AND CRITERIA FOR THE DIVISIONS OF CLASS 4 AND DIVISION 5.1

7. A schema had been decided for Division 4.1 at the thirty-third session (see ST/SG/AC.10/C.2/21/Add.1, annex 1). The rapporteur from the United Kingdom introduced his paper ST/SG/AC.10/C.2/R.507, referring first (paragraph 4) to the offer made to prepare a consolidated text. He said that on reflection it had been felt that this would be premature and would best be prepared for the Committee in December, after further agreements had been reached.

8. The rapporteur from the United States of America introduced that part of his paper ST/SG/AC.10/C.2/R.509 that concerned Division 4.1, explaining the introduction of the water extinction test to determine the classification of substances with a burning rate between 30 and 45 secs/10 cm and of a new box into the flow chart. There was not general support for that proposal.

9. However, the amendments proposed in the United Kingdom paper ST/SG/AC.10/C.2/R.507 to provide for assignment to Packing Groups II and III were adopted with a modification to one sentence (see annex 1 to this report). The flow chart was to remain in the form decided at the last session.

10. Concerning Division 4.2, three documents were available: ST/SG/AC.10/C.2/R.509 from the United States of America, -/R.518 from the Federal Republic of Germany and -/R.519 from Japan.

11. A lengthy discussion ensued on the definition of "pyrophoric" and the desirability of tests for pyrophoricity. The rapporteur from the United States of America and the representative of HMAC said that a test was needed, particularly for pyrophoric liquids that might be diluted to a concentration where they were no longer pyrophoric. The Group of Rapporteurs rejected the Whatman filter paper char test and decided that a pyrophoricity test should be based on the one described in part 1 (1.1 to 1.7) of the document of the Federal Republic of Germany (ST/SG/AC.1 /C.2/R.518).

12. The rapporteur from Japan, introducing his paper ST/SG/AC.10/C.2/R.519, said that further experiments had reconfirmed their test method for Division 4.2 self-heating substances originally presented in document ST/SG/AC.10/C.2/R.462, with the sole amdendment of reducing the size of the sample for assignment to Packing Group II from 5 cm cube to 2.5 cm cube, but retaining a temperature rise of 200°C over a 12 hour period for both the 2.5 cm and 10 cm cube samples (results given for activated carbon and sodium hydrosulphite).

13. In document ST/SG/AC.10/C.2/R.518 the Federal Republic of Germany was proposing a similar test but with a bigger sample (10 cm cube) and a temperature rise to 400°C over 48 hours.

14. In document ST/SG/AC.10/C.2/R.509, annex 4, with a slightly different test, the United States of America was proposing a rise of 20°C at any time during a 24 hour period (results given for three different oils).

15. The Group of Rapporteurs felt that without a convincing series of test results it was not in a position to decide between the three different sets of conditions presented to them. Nevertheless, on one principle there was unanimous agreement that any test method adopted should, if it were to be applied, confirm existing classifications and would not result in wholesale alteration of currently listed Division 4.2 self-heating substances.

16. It was agreed that countries should test a series of substances, including some which should not be classified as 4.2 self-heating substances, using the three different methods in order to test how well they reflected current classification in Division 4.2. These results with justification should be presented to the next session of the Group of Rapporteurs to enable them to take a decision. The rapporteur from Japan was asked if he would present a consolidated

text, i.e. the proposal from document ST/SG/AC.10/C.2/R.462 with the amendments in document ST/SG/AC.10/C.2/R.519, which would facilitate the consideration of his proposal as a whole.

17. It was agreed that the three countries, and any others who cared to test their methods, would present results to the next session of the Group of Rapporteurs. These would be the two tests (for Group 1 and Group 2 materials) in document ST/SG/AC.10/C.2/R.518 of the Federal Republic of Germany; the test in annex 4 of document ST/SG/AC.10/C.2/R.509 from the United States of America; and the test in document ST/SG/AC.10/C.2/R.462, as modified by document ST/SG/AC.10/C.2/R.519, from Japan.

18. For the consideration of Division 4.3 the consolidated text presented by the secretariat in document ST/SG/AC.10/C.2/R.482 was used. All the editorial modifications proposed in paragraph 5 (i) to (vi) of document ST/SG/AC.10/C.2/R.503 from the United Kingdom were agreed including the deletion of part 4, in the absence of any need for reference substances.

19. The proposal from Japan in document ST/SG/AC.10/C.2/R.520 to use dilute (0.6N) hydrochloric acid in place of water was not adopted. The rapporteur from Japan accepted this decision but expressed the wish to see some concrete results using water. It was noted, however, that "distilled" water should be specified throughout the test.

20. In annex 5 of document ST/SG/AC.10/C.2/R.509, the United States of America proposed some "streamlining" of the existing text in document ST/SG/AC.10/C.2/R.482 and the specification of the amount of water to be used. However, these proposals were not adopted.

21. For assigning substances to Packing Group I the figures of 500 ml per gram had been left in brackets. In document ST/SG/AC.10/C.2/R.525 from the Federal Republic of Germany it was proposed that this should be 10 ml per gram. This was adopted, but in the form "10 litres per kilogram".

22. The text as amended, was adopted (see annex 1 to this report).

23. For Division 5.1 the observer from the Netherlands proposed tnat the possibly anomalous position of nitrate fertilizers should be examined first, for example on the basis of the documents ST/SG/AC.10/C.2/R.510 from Norway or ST/SG/AC.10/C.2/R.515 from APEA. However, after some discussion the Group of Rapporteurs decided to consider tests and criteria for Division 5.1 in general and leave the problem of fertilizers until it became clear whether they were a problem or not.

24. On the question of principles concerning Division 5.1 the rapporteur from the Federal Republic of Germany introduced his paper ST/SG/AC.10/C.2/R.527 wherein it was proposed that several tests might be used for assigning Division 5.1 substances and a flow chart used for determining entry into this division.

25. This idea was opposed by the rapporteur from the United Kingdom who quoted paragraph 2 of his paper ST/SG/AC.10/C.2/R.504 on the subject, adding that he supported in general the test method adopted at the last session (see ST/SG/AC.10/C.2/21/Add.1, annex 2). This opinion was supported by the rapporteurs from Norway and the United States of America and there was no further support for the document ST/SG/AC.10/C.2/R.527 of the Federal Republic of Germany.

26. Another principle, the question of what reference material and whether only one or several, was discussed at length. The rapporteur from France declared each substance suggested had advantages and disadvantages. The rapporteur from Norway said it was premature to start with the reference material and he proposed that first, agreement should be reached on a standard test method and then it should be proven, by performing a series of tests with one or more of the reference materials suggested.

27. This was agreed and consideration began on the basis of the text in the report of the last session (ST/SG/AC.10/C.2/21/Add.1, annex 2).

28. The rapporteur from the United States of America proposed that his revised text in document ST/SG/AC/10/C.2/R.508 should be used since, amongst other amendments, they had reduced their sample size drastically. However, although the idea was adopted, it was the text of annex 2 that was amended.

29. First the word "intimately" was changed to "thoroughly" in 1.1 - Introduction. Then the second sentence was deleted.

30. For 1.2 - Procedure, the rapporteur from Japan drew attention to his paper ST/SG/AC.10/C.2/R.521 where the sample size was defined as 30 grams. This was adopted. He also drew attention to the special preparation of the combustible material, sawdust.

31. The rapporteur from France also underlined the importance of the type of wood, the fineness of the particles, and the dryness. The rapporteur from the Federal Republic of Germany agreed wholeheartedly with this.

32. There was general agreement with the need to carefully prepare the combustible material but it was felt this was adequately covered in 1.2.2 for what would, in any case, be a comparative test.

33. The text in 1.2.4 was replaced by that proposed by the United Kingdom (ST/SG/AC.10/C.2/R.504, paragraph 6 (d)) with some small amendments i.e. deletion of the examples of metals for the wire and the instruction to remove the wire after ignition.

34. There was general agreement that the use of flame height as a parameter was undesirable and that time should be the only criterion measured. However, it was also agreed that some definition should be given to determine at what point the time should be recorded. There were three proposals: burning to ash; disappearance of all flame; or cessation of smoking. The second option, disappearance of flame, was chosen by the majority and 1.2.5 amended accordingly.

35. The rapporteur from the Federal Republic of Germany felt that one performance of a test was not good enough and suggested it should be repeated three times as proposed by Japan. This was agreed and a new sentence 1.2.6 stating this, was added.

36. The reference to flame height in 1.3 was, as a consequence of the previous decision, deleted but the requirement to repeat a test three times necessitated the inclusion of a reference to the "mean of the results of the three tests" in each case, i.e. each ratio of mix and reference mixture.

37. In order to complete the text, the assignment of packing group - 1.4, was based on the proposal for this section in document ST/SG/AC.10/C.2/R.504 of the United Kingdom but all reference substances were replaced by empty square brackets, with the exception of ammonium persulphate in 1.4.3 which was itself placed in square brackets.

38. There was unanimous agreement that the application of this test method should not result in changes in the classification of existing Division 5.1 substances. However, it was agreed there were two aspects to the test method, first, the reference material to be used in the main test and secondly, the reference materials used to establish the Packing Groups.

39. Although it was pointed out that test results with various substances were to be found in the documents ST/SG/AC.10/C.2/R.508 and -/R.521 of the United States of America and Japan respectively, it was requested that countries would repeat them, using the method just adopted and, preferably, the four substances mentioned in document ST/SG/AC.10/C.2/21, paragraph 44 as standard reference material, in order to have sufficient data on which the Group at its next session could base its final decision. As to what reference substances might be used to determine Packing Groups, the substances already tested by the Japanese or the Americans might be taken as an indication.

40. For liquid oxidizers, the method already adopted at the last session in document ST/SG/AC.10/C.2/21/Add.1, annex 2 was taken as a basis for discussion, it was recognized that its presentation did not conform to that of the methods already adopted and the secretariat was asked to rectify this. The rapporteur from Japan drew attention to the test results in his document ST/SG/AC.10/C.2/R.522.

41. It was agreed that the section on test results (2.3.6) and the table 1 were irrelevant and they were deleted. It was proposed that the assignment of packing groups should use the same text as for solid oxidizers, i.e. that from document ST/SG/AC.10/C.2/R.504; this was agreed.

42. The same request was made to countries as for solid oxidizers, namely, that they should present data using the test method and suitable reference substances so that a final decision may be taken on these at the next session.

43. The documents ST/SG/AC.10/C.2/R.510 and -/R.515 from Norway and APEA associated with the Netherlands, respectively, both dealt with how to align test methods with substances already classified in 5.1 and with the classification of potential Division 5.1 substances, such as nitrate fertilizers.

44. Several rapporteurs expressed support for the ideas in document ST/SG/AC.10/C.2/R.510 although the rapporteur from the United States of America felt that the results of tests should be followed by judgment based on experience rather than the reverse. However, the Group of Rapporteurs felt it was a little premature and that a new chapter was not necessarily the right solution. It was suggested that Norway might revise its proposal when the text of the test methods for the divisions of Class 4 and Division 5.1 was completed, hopefully by the next session, and present it possibly to the Committee in December. This, the rapporteur from Norway agreed to do.

45. The observer from the Netherlands expressed the hope that the test methods adopted would be subject to close scrutiny in the light of experience gained from their use and the reliability of the data that countries would collect. This should enable the soundness of the criteria chosen to be judged.

INTERMEDIATE BULK CONTAINERS (IBCs)

46. The Recommendations for fibreboard IBCs were considered on the basis of the text prepared and presented by CEFIC (ST/SG/AC.10/C.2/R.446/Rev.1).

47. The detail "for handling" was deleted from 16.6.2.1. The prohibition in top lifting devices was queried, however it was accepted that, at present, top lifting was not feasible but should future developments render it so then the text could be suitably amended.

48. The puncture resistance in 16.6.3.2.3 was changed and reference to an ISO Standard included and certain other minor changes were made (see annex 1 to this report).

49. The rapporteur from France supported by the rapporteur from the United Kingdom said he believed there was a need in 16.6.3.4.3 for details concerning the attachment of the body to the pallet and he would make a proposal in this sense.

50. The rapporteur from Norway questioned whether a paragraph concerning inspection was not necessary. The general opinion was that paragraphs in the general section (16.1.6.1 and 16.1.4) would cover this, since this type of IBC was mostly intended for one-way trips.

51. The rapporteur from Japan queried the distinction between the marking of IBCs designed to be stacked and those not to be stacked. It was pointed out that a zero ("0") in the position of the mark for the stacking test load (see 16.1.5.1 (f)) would make this clear.

52. Wooden IBCs were considered in a like manner on the basis of document ST/SG/AC.10/C.2/R.447/Rev.1. Some rearrangement of the text was made and it was adopted (see annex 2 to this report).

53. In document ST/SG/AC.10/C.2/R.505, the United Kingdom sought to rationalize the drop test for metallic prismatic IBCs and allow a differentiation of drop height for Packing Groups II and III. This was adopted.

54. In order to allow for permanent deformation which might occur during the hydraulic pressure test under 16.2.8.5, CEFIC introduced, in document ST/SG/AC.10/C.2/R.506, the possibility of using another IBC for the drop test. This was supported by the majority of the Group. However, the rapporteur from Italy, supported by the rapporteur from the United Kingdom, wished to have this possibility limited to IBCs of the series 21 and 31. This qualification was not adopted and consequently the rapporteur from Italy expressed his reserve concerning this amendment for reasons of safety.

55. Consideration of document ST/SG/AC.10/C.2/R.529 from France was postponed to the next session since sufficient time had not been available to study it.

MISCELLANEOUS

56. The proposal from Japan concerning the Precedence of hazard table (ST/SG/AC.10/C.2/R.461) that had been briefly considered at the last session was re-examined and was adopted with the addition of the phrase "and water wetted explosives" in two places (see annex 3 to this report).

57. The proposals in document ST/SG/AC.10/C.2/R.463 of the observer from Sweden were examined attentively and there was considerable sympathy with the reasoning behind them. However, it was felt that if development in paper manufacture had advanced so far, an even simpler and clearer text would be desirable. The problem of momentarily, slightly leaky valves was best coped with pragmatically until all the ramifications of introducing a new packaging code (i.e. for paper bags 5M3: all joins and closures should be siftproof) could be worked out.

58. It was felt important to take a decision on the label for Class 9, a proposal for which was in document ST/SG/AC.10/C.2/R.500 from the United Kingdom. This was agreed, note being taken of the consequential addition necessary to 13.3.1(b). The rapporteur from the United Kingdom expressed a reservation in relation to the incomplete wording adopted for amendments to Chapter 13.

ENVIRONMENTALLY HAZARDOUS SUBSTANCES

59. A general discussion on the principles associated with the question of listing environmentally hazardous subjects revealed several and sometimes divergent views.

60. The proposal in document ST/SG/AC.10/C.2/R.498 from the United States of America was of the most general nature that would put the onus of designating the actual substances onto the competent authorities. The rapporteur from the United Kingdom preferred to continue to consider individual substances on the basis of adequate data, in the hope that the number of new entries would be limited. The rapporteur from the Federal Republic of Germany was preoccupied with leaving to the modes the choice of the specific substances environmentally hazardous for their particular mode.

61. After a lengthy exchange of views it was decided that the proposal from the rapporteur from the United States of America could be adopted in principle, provided some amendments were made to the text.

62. First the entry proposed for wastes was withdrawn since the majority of the Group of Rapporteurs expressed the opinion that 13.6.1.2 rendered it unnecessary.

63. To allow the possibility of Packing Group II substances as well as Packing Group III a special provision was introduced placing the responsibility for this decision on the competent authority.

64. It was decided that the new entry should figure in the list in 13.8.4. As a consequence, the Special Provision proposed in document ST/SG/AC.10/C.2/R.498 was shortened. Finally, the two Special Provisions were combined into one deleting the reference to "environmental" before competent authority (see annex 3 to this report).

LISTING AND CLASSIFICATION

65. A working group had examined most of the documents under this item apart from those postponed at the request of ICAO and some of the document ST/SG/AC.10/C.2/R.512 from IMO and -/R.524 and -/R.528. Their recommendations will be found in the report of that group (see annex 4 to this report).

66. The rapporteur from the United States of America drew attention to the comments in paragraph 1(f) particularly concerning inhalation toxicity and invited the Rapporteurs to comment on the data in documents ST/SG/AC.10/C.2/R.497 and -/R.517. The working group was thanked for the considerable efforts that had been made and the results achieved.

UNIDROIT DRAFT CONVENTION

67. Note was taken of the ad hoc joint meeting that had taken place in November 1985 of transport experts and UNIDROIT experts. The report of that meeting, TRANS/AC.4/2, had been tabled for the current session.

ORGANIC PEROXIDES

68. The Chairman of the organic peroxides working group gave a brief resumé of the progress made during the week, in order that a decision could be taken as to whether another working group would be necessary before the Committee's session in December 1986.

69. There was a concensus that every effort should be made to complete a testing "manual" for organic peroxides in time for approval by the Committee. In the light of the Chairman's remarks; that some additional information was required for certain tests, some criteria remained to be decided and a general introduction and annexes had still to be drafted, there was unanimous agreement that another working group would be necessary.

70. The rapporteur from Japan announced that if it would be of great help he would be happy to welcome the working group to Tokyo. This invitation was greatly appreciated, but because of the various restraints on delegates for attending working groups the majority decided it would be easier to hold it during the Group of Rapporteurs/Group of Experts on Explosives Meeting in August. Although this was felt to be rather late by some delegates, it was finally decided that it would take place in Geneva during the Group of Rapporteurs/Group of Experts on Explosives meetings, starting on the morning of 4 August 1986.

71. The report of the working group was examined in detail by the Group of Rapporteurs and note was taken of the various decisions and recommendations that had been made. Some tests had been withdrawn, some modified, an arrangement had been made for the exchange of test data and countries were requested to check whether test methods were applicable to self-reactive substances. The efforts and the achievements of the Chairman and the working group as a whole were recognized and appreciated by the Rapporteurs and the report endorsed in its entirety (see annex 5 to this report).

FUTURE PROGRAMME OF WORK

72. It was agreed that the completion of the tests and criteria for the divisions of Class 4 and of 5.1 were of first priority. The rapporteur from the United Kingdom announced he would make a proposal concerning marking. There was the subject of IBCs to be finalized including an outstanding document from France. There would, of course, be the report of the organic peroxides working group to be examined. A second reading of the texts adopted for environmentally hazardous substances and the consideration of their implications and consequences.

73. Amongst the documents that had been postponed, were several concerning chapter 9, it was agreed to treat these in a separate item. The rapporteur from the United Kingdom promised a proposal concerning packagings and Chapter 6. There are already some documents for chapter 12, a subject which it had already been decided should be discussed at the August 1986 session (ST/SG/AC.10/C.2/21, paragraph 149). There were decisions to be taken on "Listing and classification" and some outstanding miscellaneous proposals.

74. The following agenda was agreed:

Test and Criteria, divisions of Classes 4 and 5.1
Completion of IBCs
Report of the Organic Peroxides working group
Environmentally Hazardous Substances
Chapter 9
Chapter 6 - Packaging
Chapter 12
Listing and classification
Miscellaneous

The thirty-fifth session of the Group of Rapporteurs was scheduled for the week 4-8 August 1986 (Group of Experts on Explosives, 11-15 August 1986). The working group on organic peroxides should start its work also on the morning of 4 August.

75. In view of the obligation to send documents to the services 10 weeks before a meeting (12 weeks before the meeting to the secretariat), the deadline for documents for the thirty-fifth session would be 12 May 1986. It was agreed that Rapporteurs making proposals would send these direct to other experts (including organizations) as well as to the secretariat, but would contact the secretariat, in advance, for the symbol number that would be designated to the document. This would greatly assist in the identification of work and its organization.

ADOPTION OF THE REPORT

76. The Group of Rapporteurs adopted the report on its thirty-fourth session and the annexes thereto.

Annex 1

TESTS AND CRITERIA FOR THE DIVISIONS OF CLASS 4 AND DIVISION 5.1

Division 4.1

The text as decided by the Group of Rapporteurs at its thirty-third session (see ST/SG/AC.10/C.2/21/Add.1, annex 1) with the modifications proposed in document ST/SG/AC.10/C.2/R.507 with the exception of paragraph 3 (c) Data '2' which should read:

"Burning time and other observations from six test runs are the basis for the evaluation."

Division 4.3

The text as presented in document ST/SG/AC.10/C.2/R.482 with the amendments proposed under "B. Other Comments" in document ST/SG/AC.10/C.2/R.503 paragraph 5 (i) to (vi).

The use of the term "distilled water" throughout and the figure of "10 litres per kilogram" in assignment to Packing Group I".

Division 5.1

1. Test method for solid oxidizers

1.1 Introduction

This test method is designed to measure the potential for a solid substance to increase the burning rate or burning intensity of a combustible substance when the two are thoroughly mixed. Two tests are run for each substance to be evaluated, one at a 1 to 1 ratio, by weight, of sample to sawdust and one at an 8 to 2 ratio, by weight, of sample to sawdust. The burning characteristics of each mixture are compared with the standard [1 to 1 ratio, by weight, of ammonium persulphate].

1.2 Procedure

1.2.1 and 1.2.2 Text as in document ST/SG/AC.10/C.2/21/Add.1.

1.2.3 A 30 g mixture of [ammonium persulphate] and wood sawdust is prepared in a 1 to 1 ratio, by weight. Two 30 g mixtures of the material to be tested, in the particle size in which it will be transported, and the wood sawdust, are prepared in ratios of 1 to 1, by weight, and 8 to 2, by weight. Each mixture should be mixed as thoroughly as possible.

1.2.4 Form each of the mixtures into a conical pile with dimensions of approximately 35 mm base diameter and 25 mm height on a cool, impervious, low-heat conducting surface. Ignition is provided by means of a wire of inert metal positioned 1 mm above the test surface and spanning the base of the cone of mixture. The wire is heated electrically to 1,000°C until the pile is ignited or it is clear that the pile cannot be ignited.

1.2.5 Record the time it takes for each mixture to burn until all flame has disappeared.

1.2.6 The test should be repeated three times for each of the mixing ratios.

1.3 Criteria

A substance should be classified in Division 5.1 if, in either concentration tested, the mean burning time of the sawdust, established from three tests, is equal to or less than that of the average of the three tests with [ammonium persulphate] mixture.

1.4, amend to read:

"1.4 Assignment of Packing Group

1.4.1 Packing Group I should be assigned to any substance which, in either concentration tested, exhibits a burning time less than that of [.....].

1.4.2 Packing Group II should be assigned to any substance which, in either concentration tested, exhibits a burning time between that of [.....] and that of [.....].

1.4.3 Packing Group III should be assigned to any substance which, in either concentration tested, exhibits a burning time between that of [ammonium persulphate] and that of [.....]."

2. Test method for Liquid Oxidizers

2.1 to 2.3.5 Text as in document ST/SG/AC.10/C.2/21/Add.1, annex 2.

Delete 2.3.6 Test results and 2.3.7 Classification.

Replace by 2.3.6 Assignment of Packing Group (text as in 1.4 above).

Annex 2

MODIFICATIONS TO CHAPTER 16: RECOMMENDATIONS ON INTERMEDIATE BULK (IBCs)

Replace the first sentence of paragraph 16.2.5.1. by the following two sentences:

"16.2.5.1. One IBC of each design type, size, shell thickness and manner of construction should be submitted to the tests listed in the order below and as set out in the paragraphs 16.2.8.1. to 16.2.8.5 inclusive. Another IBC of the same construction may be used for the drop test as set out in paragraph 16.2.8.6."

Replace existing text of paragraphs 16.2.8.6.3. to 16.2.9 with the following:

"16.2.8.6.3 Method of testing

The IBC should be dropped on to a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner as to ensure that the point of impact is on that part of the base of the IBC considered to be the most vulnerable.

16.2.8.6.4 Drop height

Packing Group II	Packing Group III
1.2 m	0.8 m

16.2.8.6.5. Criteria for passing the test

No loss of contents.

16.2.9 Additional marking

Each IBC should be fitted with a corrosion-resistant metal plate permanently attached to the shell or structural equipment in a place readily accessible for inspection. Each IBC should also bear the markings required in 16.1.5.1 and, in addition:

A letter designating the packing groups for which the design type has been successfully tested:

Y for Packing Groups II and III
Z for Packing Group III only

Capacity in litres at "20°C
etc."

The section on fibreboard IBCs should read as follows:

"16.6. Specific requirements for fibreboard IBCs

16.6.1. Scope

16.6.1.1. These provisions apply to fibreboard IBCs for the transport of solids which are loaded or discharged by gravity. Fibreboard IBCs are of the following type: 11G.

16.6.2. Definitions

16.6.2.1. Fibreboard IBCs consist of a fibreboard body with or without separate top and bottom caps, if necessary an inner liner (but no inner packagings), appropriate service and structural equipment.

16.6.2.2. Body means the receptacle proper, including openings and their closures.

16.6.2.3. Liner means a separate tube or bag inserted in the body but not forming an integral part of it, including the closures of its openings.

16.6.2.4. Service equipment means filling and discharge devices.

16.6.2.5. Structural equipment means the reinforcing, fastening, handling and protective or stabilizing members.

16.6.2.6. Maximum permissible gross mass means the mass of the IBC and its service equipment and structural equipment and the heaviest load to be carried.

16.6.3. Construction

16.6.3.1. Fibreboard IBCs should not incorporate top lifting devices.

16.6.3.2 Body

16.6.3.2.1. Strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) should be used, appropriate to the capacity of the IBC and to the service it is required to perform. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater that 155 g/m^2 - see ISO International Standard 535 - 1976 (E). It should have proper bending qualities. Fibreboard should be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending.

The fluting or corrugated fibreboard should be firmly glued to the facings.

16.6.3.2.2 The walls, including top and bottom, should have a minimum puncture resistance of 15J measured according to ISO International Standard 3036-19XX.

16.6.3.2.3 Manufacturing joins in the body of IBCs should be made with an appropriate overlap and should be taped, glued stitched with metal staples or fastened by other means at least equally effective.

Where joins are effected by gluing or taping a water resistant adhesive should be used. Metal staples should pass completely through all pieces to be fastened and be formed or protected so that any inner liner cannot be abraded or punctured by them.

16.6.3.3 Liner

16.6.3.3.1 The liner should be made of a suitable material. The strength of the material used and the construction of the liner should be appropriate to the capacity of the IBC and the intended use. Joins and closures should be sift proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transport.

16.6.3.4 Structural equipment

16.6.3.4.1 Any integral pallet base forming part of an IBC or any detachable pallet should be suitable for mechanical handling with the IBC filled to its maximum permissible gross mass.

16.6.3.4.2 The pallet or integral base should be designed so as to avoid any protrusion of the base of the IBC that might be liable to damage in handling.

16.6.3.4.3 The body should be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface should be free from sharp protrusions that might damage the IBC.

16.6.3.4.4 Strengthening devices such as timber supports to increase stacking performance may be used but should be external to the liner.

16.6.3.4.5 Where IBCs are intended for stacking the bearing surface should be such as to distribute the load in a safe manner.

16.6.4 Testing and certification

Fibreboard IBCs should be subject to design type tests in accordance with 16.6.5 which, if successful should be certified in accordance with 16.1.4.3.

16.6.5 Design type tests

16.6.5.1 One IBC of each design type, size and manner of construction should be submitted to the tests listed in the order below and as set out in the paragraphs indicated. These design type tests should be carried out as required by the competent authority.

Test	See 16...	11G
Bottom lift	6.6.1	required
Stacking	6.6.2	required a/
Drop	6.6.3	required

a/ when IBCs are designed to be stacked.

16.6.5.2 The competent authority may permit the selective testing of IBCs which differ only in minor respects from a tested type e.g. with small reductions in external dimensions.

16.6.5.3 If detachable pallets are used in the tests the test report issued in accordance with 16.1.4.3.2 should include a technical description of the pallets used.

16.6.6 Design type test specifications

Fibreboard IBCs should be conditioned for at least 24 hours in an atmosphere having a controlled temperature and relative humidity (r.h.). There are three options, one of which should be chosen. The preferred atmosphere is 23 ± 2°C and 50% ± 2% r.h.

The two other options are 20° ± 2°C and 65% ± 2% r.h. or 27% ± 2°C and 65% ± 2% r.h.

16.6.6.1 Bottom lift test

16.6.6.1.1 Applicability

For all IBCs as a design type test.

16.6.6.1.2 Preparation of IBCs for test

The IBC should be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

16.6.6.1.3 Method of testing

The IBC should be raised and lowered twice by a lift truck with the forks inserted to 0.75 times the maximum width of the base of the IBC, at the points provided for lifting (where not specifically provided for otherwise in the pallet/base design). The test should be repeated from each possible direction of entry.

16.6.6.1.4 Criteria for passing the test

No permanent deformation which renders the whole IBC including the base pallet unsafe for transport and no loss of contents.

16.6.6.2 Stacking test

16.6.6.2.1 Applicability

For all IBCs which are designed to be stacked on each other as a design type test.

16.6.6.2.2 Preparation of IBCs for test

The IBC should be loaded to its maximum permissible gross mass.

16.6.6.2.3 Method of testing

The IBC should be placed on its base on level hard ground and subjected to a uniformly distributed superimposed test load (see 16.6.6.2.4) for a period of 24 hours.

This load should be applied by one of the following methods:

One or more IBCs of the same type loaded to their maximum permissible gross mass and stacked on the test IBC;

Appropriate weights loaded on to either a flat plate or a reproduction of the IBCs base, which is stacked on the test IBC.

16.6.6.2.4 Calculation of superimposed test load

The load to be placed on the IBC should be 1.8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during transport.

16.6.6.2.5 Criteria for passing the test

No permanent deformation which renders the whole IBC including the base pallet unsafe for transport and no loss of contents.

16.6.6.3 Drop test

16.6.6.3.1 Applicability

For all IBCs as a design type test.

16.6.6.3.2 Preparation of the IBC for the test

The IBC should be filled to not less than 95 % of its capacity in accordance with its design type.

16.6.6.3.3 Method of testing

The IBC should be dropped onto a rigid, non resilient, smooth, flat and horizontal surface, in such a manner as to ensure that the point of impact is on the part of the base of the IBC considered to be the most vulnerable.

16.6.6.3.4 Drop height

Packing Group II	Packing Group III
1.2 m	0.8 m

16.6.6.3.5 Criteria for passing the test

No loss of contents. A slight discharge from a closure upon impact should not be considered to be a failure of the IBC provided that no further leakage occurs.

16.6.7 Additional Marking

Each IBC should bear the markings required by 16.1.5.1 and in addition:
A letter designating the packing groups for which the design type has been successfully tested:

Y for packing groups II and III
Z for packing group III only
Tare mass in kg
Maximum permissible gross mass, in kg."

The section on wooden IBCs should read as follows:

"16.7 Specific requirements for wooden IBCs

16.7.1 Scope

16.7.1.1 These provisions apply to wooden IBCs for the transport of solids which are loaded or discharged by gravity. Wooden IBCs are of the following types:

11C Natural wood with inner line
11D Plywood with inner liner
11F Reconstituted wood with inner liner.

16.7.2 Definitions

16.7.2.1 Wooden IBCs consist of a rigid or collapsible wooden body together with an inner liner (but no inner packagings) and appropriate service and structural equipment.

16.7.2.2 Body means the receptacle proper, including openings and their closures.

16.7.2.3 Liner means a separate tube or bag inserted in the body but not forming an integral part of it, including the closures of its openings.

16.7.2.4 Service equipment means filling and discharge devices.

16.7.2.5 Structural equipment means the reinforcing, fastening, handling and protective or stabilizing members.

16.7.2.6 Maximum permissible gross mass means the mass of the IBC and its service equipment and structural equipment and the heaviest load authorized to be carried.

16.7.3 Construction

16.7.3.1 Wooden IBCs should not incorporate top lifting devices.

16.7.3.2 Body

16.7.3.2.1 The strength of the materials used and the method of construction should be appropriate to the capacity and intended use of the IBC.

16.7.3.2.2 Natural wood should be well seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the IBC. Each part of such an IBC should consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when a suitable method of glued assembly is used: as for instance Lindeman joint, tongue and groove joint, ship lap or rabett joint or butt joint with at least two corrugated metal fasteners at each joint.

16.7.3.2.3 Bodies of plywood should be at least 3-ply. It should be made of well seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the body. All adjacent plies should be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the body.

16.7.3.2.4 Bodies of reconstituted wood should be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.

16.7.3.2.5 IBCs should be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.

16.7.3.3 Liner

16.7.3.3.1 The liner should be made of a suitable material. The strength of the material used and the construction of the liner should be appropriate to the capacity of the IBC and the intended use. Joins and closures should be sift proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transport.

16.7.3.4 Structural equipment

16.7.3.4.1 Any integral pallet base forming part of an IBC or any detachable pallet should be suitable for mechanical handling with the IBC filled to its maximum permissible gross mass.

16.7.3.4.2 The pallet or integral base should be designed so as to avoid any protrusion of the base of the IBC that might be liable to damage in handling.

16.7.3.4.3 The body should be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface should be free from sharp protrusions that might damage the IBC.

16.7.3.4.4 Strengthening devices such as timber supports to increase stacking performance may be used but should be external to the liner.

16.7.3.4.5 Where IBCs are intended for stacking the bearing surface should be such as to distribute the load in a safe manner.

16.7.4 Testing and certification

Wooden IBCs should be subject to design type tests in accordance with 16.7.5 which, if successful, should be certified in accordance with 16.1.4.3.

16.7.5 Design type tests

16.7.5.1 One IBC of each design type, size and manner of construction should be submitted to the tests listed in the order below and as set out in the paragraphs indicated. These design type tests should be carried out as required by the competent authority.

Test	See 16 ...	11C, 11D, 11F
Bottom lift	7.6.1	required
Stacking	7.6.2	required a/
Drop	7.6.3	required

a/ when IBCs are designed to be stacked.

16.7.5.2 The competent authority may permit the selective testing of IBCs which differ only in minor respects from a tested type e.g. with small reductions in external dimensions.

16.7.5.3 If detachable pallets are used in the tests, the test report issued in accordance with 16.1.4.3.2 should include a technical description of the pallets used.

16.7.6 Design type test specifications

16.7.6.1.1 Bottom lift test

16.7.6.1.1 Applicability

For all types of IBCs as a design test.

16.7.6.1.2 Preparation of IBCs for test

The IBC should be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

16.7.6.1.3 Method of testing

The IBC should be raised and lowered twice by a lift truck with the forks inserted to 0.75 times the maximum width of the base of the IBC, at the points provided for lifting (where not specifically provided for otherwise in the pallet/base design). The test should be repeated from each possible direction of entry.

16.7.6.1.4 Criteria for passing the test

No permanent deformation which renders the whole IBC including the base pallet unsafe for transport and no loss of contents.

16.7.6.2 Stacking test

16.7.6.2.1 Applicability

For all IBCs which are designed to be stacked on each other as a design type test.

16.7.6.2.2 Preparation of IBCs for test

The IBC should be loaded to its maximum permissible gross mass.

16.7.6.2.3 Method of testing

The IBC should be place on its base on level hard ground and subjected to a uniform distributed superimposed test load (see 16.7.6.2.4) for a period of 24 hours.

The load should be applied by one of the following methods:

One or more IBCs of the same type loaded to their maximum permissible gross mass and stacked on the test IBC;

Appropriate weights loaded on to either a flat plate or a reproduction of the IBCs base, which is stacked on the test IBC.

16.7.6.2.4 Calculation of superimposed test load

The load to be placed on the IBC should be 1.8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during transport.

16.7.6.2.5 Criteria for passing the test

No permanent deformation which renders the whole IBC including the base pallet unsafe for transport and no loss of contents.

16.7.6.3 Drop test

16.7.6.3.1 Applicability

For all types of IBCs as a design type test.

16.7.6.3.2 Preparation of the IBC for the test

The IBC should be filled to not less than 95 % of its capacity in accordance with the design type.

16.7.6.3.3 Method of testing

The IBC should be dropped onto a rigid, non resilient, smooth, flat and horizontal surface, in such a manner as to ensure that the point of impact is on that part of the base of the IBC considered to be the most vulnerable.

16.7.6.3.4 Drop height

Packing Group II	Packing Group II
1.2 m	0.8 m

16.7.6.3.5 Criteria for passing the test

No loss of contents. A slight discharge from a closure upon impact should not be considered to be a failure of the IBC provided that no further leakage occurs.

16.7.7 Additional Marking

Each IBC should bear the markings required by 16.1.5.1 and in addition:
A letter designating the packing groups for which the design type has been successfully tested:

Y for packing groups II and III
Z for packing groups III only
Tare mass in kg
Maximum permissible gross mass, in kg."

Annex 3

MISCELLANEOUS AMENDMENTS

Replace the Precedence of Hazard Table at the end of chapter 1 by the revised version in document ST/SG/AC.10/C.2/R.461, with the addition of the phrase "and water-wetted explosives" after "self-reactive substances" in footnote *** and in the last sentence.

Chapter 2

Add a new entry as follows:

"30XX ENVIRONMENTALLY HAZARDOUS SUBSTANCES N.O.S. Class 9 Special Provision 1XY"

Chapter 3

Add a new Special Provision to read:

"1XY The designation of this substance as well as whether it should be placed in Packing Group II or III is to be decided by the competent authority."

Chapter 13

The label as it appears in document ST/SG/AC.10/C.2/R.500 should be inserted under the title "13.5.9 CLASS 9" with underneath:

"Miscellaneous dangerous substances

Background: white with seven vertical black stripes in upper half."

13.3.1(b) should be amended to read:

"... are supplemented by five others... on a circle), harmful substances... on ear of wheat) and miscellaneous dangerous substances (top half of label seven black and six white alternating vertical stripes, bottom half white); and ...".

Annex 4

REPORT OF THE INFORMAL GROUP ON LISTING AND CLASSIFICATION

1. An informal group was established to give preliminary consideration to the documents concerning listing and classification that were listed under agenda item 6 of the agenda. The following will summarize the action taken relative to each of these documents:

(a) ST/SG/AC/10/C.2/R.465/Add.1, -/R.496 and -/R.502. The informal group noted that at the request of ICAO these documents had been deferred for consideration to the next session.

(b) ST/SG/AC.10/C.2/R.484. The proposal in this document for a new entry for aluminium alkyl hydrides was adopted, see below.

(c) ST/SG/AC.10/C.2/R.487. The proposal in this document to assign a control and an emergency temperature to UN No. 3036 was adopted, see below.

(d) ST/SG/AC.10/C.2/R.489. This proposal, concerning the addition of a number of pesticides to table 6.1, was rejected because it lacked supporting data and because the group had information indicating that the pesticides proposed for inclusion did not meet the definition for Division 6.1.

(e) ST/SG/AC.10/C.2/R.492. There was general support for the proposal in this document to add a new entry for perchloryl fluoride, but before taking a final decision the group requested the rapporteur from Italy to resubmit the proposal along with a completed data sheet and an indication of whether this substance is transported internationally.

(f) ST/SG/AC.10/C.2/R.497 and -/R.517. The informal group took note of these documents which drew attention to a inconsistencies in the classification of a number of substances believed, by their authors, to present a Packing Group I toxic inhalation hazard. In the case of ST/SG/AC.10/C.2/R.517, transmitted by Canada, changes were proposed to the classification of a number of substances. The rapporteur from the United States of America noted that information received after submission of his document indicated that the data in ST/SG/AC.10/C.2/R.497 relative to UN Nos. 2404, 2325 and methacrylonitrile were incorrect and that these substances should be removed from further consideration. The informal group was of the opinion that insufficient time had been available prior to the meeting to allow adequate review of these documents. Therefore, it was agreed that they should be considered at the next session and that Rapporteurs should be invited to present any available data to either confirm or refute that presented in ST/SG/AC.10/C.2/R.497 and -/R.517.

(g) ST/SG/AC.10/C.2/R.485. The informal group agreed to the new special provision proposed for UN No. 3063 in this document, see below.

(h) ST/SG/AC.10/C.2/R.499. The proposal regarding the classification of organic peroxides presented in the document was adopted with some amendments, see below.

(i) ST/SG/AC.10/C.2/R/486. The proposals regarding UN Nos. 2110 and 3047 were adopted, see below. The rapporteur from the United Kingdom did, however, question the concentration changes to 67% when the tests had been conducted on a substance of a concentration of only 64.2% tert-Butyl peroxypivalate.

(j) ST/SG/AC.10/C.2/R.488. The proposal in this document was adopted with the modification that, rather than adding an additional entry for tert-Butyl isopropyl carbonate, the existing entry (UN No. 2103) would be modified in light of the data provided in the document, see below. The rapporteur from the United Kingdom again expressed concern that a concentration of 77% of substance was being specified in the entry, while the substance actually tested was of a concentration of only 74.3%.

(k) The group noted an inconsistency between the concentrations specified in the entry for UN No. 2089 and its associated special provision 72 and agreed that UN No. 2089 should be revised to eliminate this inconsistency (see below).

(l) ST/SG/AC/10/C.2/R.501. The informal group adopted the proposals in this document relating to the nomenclature of nitrogen oxides (see below).

(m) ST/SG/AC.10/C.2/R.511, -/R.515. These documents were discussed and will be revised in light of comments offered and resubmitted for future consideration.

(n) ST/SG/AC.10/C.2/R.512. All items on listing and classificaton in this document (i.e. paragraphs 2-8) were considered. The proposals in paragraphs 2, 3, 5 and 6 were agreed, while those in paragraphs 4, 7 and 8 will be reconsidered in light of comments offered and be made the subject of a future submission.

With respect to paragraph 4 concerning aerosols (UN No. 1950), it was noted that the difficulties raised by IMO could possibly be resolved by developing a new special provision for UN No. 1950 providing that outer packagings used for aerosols should comply with the requirements for the medium danger (Packing Group II) category.

(o) The informal group was unable to consider documents ST/SG/AC.10/C.2/R.524 and -/R.528 owing to lack of time and the Group of Rapporteurs may wish to consider these documents separately, as well as the remainder of document ST/SG/AC.10/C.2/R.512.

Amendments proposed by the informal group

1. New entries (apply also to the index)

3076 ALUMINIUM ALKYL HYDRIDES
Class or Divison: 4.2; Packing Group I

2. Miscellaneous amendments to entries (apply also to the index as appropriate)

UN Nos. 3036 For control temperature and emergency temperature read "35°C" and "40°C" respectively

3063 Under special provisions add "176"

2110 For "72%" read "67%"

3047 For "72%" read "67%"

2089 In place of the change indicated for this entry in annex 4 of ST/SG/AC.10/C.2/21/Add.1, the entry should be amended as follows: for "not less than 30%" read "more than 32%"

2103 Name and description to read "tert-BUTYLPEROXY ISOPROPYL CARBONATE, not more than 77% in solution" and packing method to read "P1a, P8".

1564 Under special provisions add "177"

2985 For Packing Group "I" read "II"

1067 Name and description to read: "DINITROGEN TETROXIDE (NITROGEN DIOXIDE), LIQUEFIED"

1975 Name and description to read: "NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURES (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURES)."

CHAPTER 3 - SPECIAL PROVISIONS RELATING TO INDIVIDUAL SUBSTANCES AND ARTICLES

Add a new special provision 176 to read:

"Exempt if the technically pure organic peroxide is mixed with not less than 87% of sodium sulphate and magnesium sulphate and if this mixture is transported in packagings up to 400 kg."

Add a new special provision 177 to read:

"Barium sulphate is considered non-dangerous."

CHAPTER 11 - SPECIAL RECOMMENDATIONS RELATING TO DIVISION 5.2

Insert a new paragraph 11.2.1 to read:

"11.2.1 An organic peroxide should be classed in Division 5.2 unless, upon review of appropriate test data and taking into account the classification principles in paragraph 11.2, the competent authority has determined that the substance does not present the hazard of an organic peroxide in transport."

The existing paragraphs 11.2.1 and 11.2.2 are renumbered accordingly. Attention is also drawn to box I in Fig. 11.1 and to paragraph 14.3.1 which will also need changing.

CHAPTER 12 - RECOMMENDATIONS ON MULTIMODAL TANK TRANSPORT

In Table 12.1 for UN No. 1067, name and description to read: "Dinitrogen tetroxide, liquefied".

INDEX

The following changes affect the index only:

Delete: "Lamp black, see ..... 4.2 1361"
"Nitrogen tetroxide, see .... 2 1067"
"Nitrogen tetroxide and nitric oxide mixtures, see ..2 1975"

Add: "DINITROGEN TETROXIDE, LIQUEFIED ..... 2 1067"
"NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURES ... 2 1975"

Amend: "NITRIC OXIDE AND NITROGEN TETROXIDE MIXTURES ..2 1975"
to read: "NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURES ..... 2 1975".

Annex 5

REPORT OF THE WORKING GROUP ON ORGANIC PEROXIDE TEST METHODS

1. The Working Group engaged in the preparation of a manual of test methods for organic peroxides under the chairmanship of Mr. Th. M. GROOTHUIZEN (The Netherlands). Representatives of the following countries participated in the working group: France; Germany, Federal Republic of; Japan; Netherlands; Sweden; United Kingdom; United States of America. The European Council of Chemical Manufacturers' Federations (CEFIC) was also represented.

2 It was decided to discuss the test methods following the sequence of the flow chart boxes using the following checklist as a guideline:

(a) Does the test provide an answer to the question stated in the flowchart box?

(b) Is the test description complete and clear?

(c) Is there sufficient experience with organic peroxides? Has sufficient data been provided?

(d) Have proposals been introduced for the various criteria?

GENERAL ITEMS APPLICABLE TO ALL TEST METHODS

3. During the discussions on the respective test methods the following general items were decided:

(a) the heading of the paragraph "test data" will be changed into "EXAMPLES OF RESULTS".

(b) the substances in the tables will be listed in sequence of their UN numbers.

(c) If applicable, the density of a solid substance as tested will be included in the list of results.

(d) Information on the temperature of the substance, the apparent density of solids at which the tests shall be carried out and on compatibility with equipment shall be given in an annex to the test manual.

(e) No commercial firms will be mentioned in the test descriptions.

(f) Agreed changes in the test descriptions are found in the appendix to this annex. Such changes are not mentioned in the comments on the various tests.

(g) References to parts of the manual of "Tests and Criteria for the classification of explosive substances and articles" should be avoided where possible. Although the tests have the same title there are significant differences when they are applied to organic peroxides. Changes in the explosives manual will not automatically be introduced into the organic peroxide manual.

(h) All criteria shall include both upper and lower limits instead of only upper limits. If possible, examples will be listed for each criterion.

(i) If applicable the density or sample weight of the substance in the test equipment will be given in the test report.

(j) The manual contains tests which have to be used for classification purposes as well as some newly developed instrumented tests. For the time being the preferred results are those from the proven simpler methods. However, it is proposed to use the newly developed instrumented methods to gather more information. When more experience has been obtained considerations will be made for these tests to be given equivalent status. A test in this category is the Thermal Explosion Vessel test.

(k) Dimensions should be given in metric units.

(l) A remark concerning preliminary tests will be introduced in the General introduction:

"Although the tests described are considered sufficient for classification purposes, it is essential for the safety of workers and equipment that small scale preliminary tests are carried out on the substances before attempting to handle larger quantities."

(m) In an annex to the manual, national contacts for test details will be given.

(n) According to some of the participants, the accepted test methods can be used for the classification of self-reactive substances, while other participants reserved their position. Countries are requested to check whether the test methods are applicable to self-reactive substances.

(o) The working group studied the various possibilities to achieve a unique classification by means of the available test methods. It was agreed that the following methodology will be used for classification:

First, the criteria of the tests approved for one box will be selected in such a way that they yield the same answer as far as possible (equivalency of test methods).

Secondly, combinations of tests from the flowchart boxes will be made in such a way that each combination yields the same classification as far as possible (test train).

The objective of the above methodology is to arrive at classifications which agree with the present ones for the majority of substances.

(p) A number of peroxides were mentioned which might be difficult to classify. It was arranged that the working group members will exchange test data so that the classification procedure for these products can be assessed.

(q) In the general introduction it will be reflected that where the classification of a substance is ambiguous, additional tests may be carried out in order to find the correct classification.

BOX 1 of FLOWCHART

4. (a) It was decided that all tests for box 1 should contain the following columns if applicable : substance; UN number; fragmented length (cm); measured velocity (m/s); result.

(b) The laboratories shall reconsider the use of velocity measurement as a criterion for detonation tests. If the velocity criterion is accepted then a method to determine the sound velocity in the test substance should be given in the annex to the test manual.

(c) Some participants preferred the answer "partial reaction" instead of the answer "partial" in the flowchart and in the classification principles of organic peroxides (see 11.2.1).

It was agreed that the delegation of the United States of America will submit a proposal.

(d) The question was raised whether all tests for box 1 will provide equivalent results, or the same answers, and if a primary test ("grandfather test") should be nominated. It was decided not to have such a primary test.

BAM 50/60 steel tube test (L.P.1)

5. The test method was adopted. A few amendments were introduced (see appendix to this annex). The following item remains to be solved: the third paragraph on page 3 of this document needs more clarification with respect to answer 1.2 in connection with velocity measurement.

TNO 50/70 steel tube test (ST/SG/AC.10/C.2/R.481)

6. The test method was adopted with the amendments given in the appendix to this annex. It was agreed that the apparatus section should include the description of tube types A, B and C.

Modified Trauzl (ST/SG/AC.10/C.2/R.483)

7. The test was withdrawn for answering box 1.

Gap test for solids and liquids (ST/SG/AC.10/11)

8. The test is accepted in principle. For peroxides the test criteria will be adjusted to the specific properties of these substances. In particular the answer "partial" will be introduced. A list with test data will be submitted. The test temperature and the use of a bubbler will be reconsidered.

A new description of the test will be provided in a formal document.

Gap test (ST/SG/AC.10/C.2/R.494)

9. The test was accepted but the following reservations were expressed:

The short length of the test tube (20 cm),

The unique criterion of 1400 m/s for liquids and solids,

The appropriateness of using the "impression" of the witness plate as a test criterion, e.g. in connection with the test result for dry dibenzoyl peroxide which leads to the answer "partially",

Data on inert substances were not reported,

There is no possibility to detect unreacted substance.

BOX 2 of FLOWCHART

Detonation test in package (ST/SG/AC.10/C.2/R.514)

10. The test was accepted in principle. Only a very few peroxides will have to be tested by this method, therefore there is insufficient experience. It was agreed that trials with dry dibenzoyl peroxide will be performed to see if cratering and perforation of the witness plate occur. The explosive charges will be specified and their positions shown by a drawing.

BOX 3 and BOX 4 of FLOWCHART

11. It was discussed whether the Time/Pressure test and the Deflagration test should both be used when determining deflagration properties. Although there was strong support for this idea a unanimous decision was not reached at this time.

Time/pressure test (ST/SG/AC.10/C.2/R.480)

12. The test method was accepted although there were still some doubts about the application of this test to liquid peroxides. It was agreed that when the result "failed to ignite" was obtained, the unconfined Deflagration test should then be carried out. This decision will be reflected in the test description.

Several questions were raised concerning the fusehead and it was agreed that

Fuseheads with equivalent properties may be used instead of those described in the paper,

The position of the fusehead in the vessel will be described.

A reliable source for supply of the primed cambric has to be assured and held available by the competent laboratory of the United Kingdom.

The criterion for the answers 3.2/4.2 "yes, slowly" and 3.3/3.4 "no" in paragraph 6 will be reconsidered.

The text will be revised to clearly indicate that the pressure range "690 to 2070 kPa" has to be understood as overpressure.

The drawing in figure 5 will be completed.

Deflagration test (ST/SG/AC.10/C.2/R.481)

13. The test was accepted with the amendments shown in the appendix.

Tests will be carried out on dicyclohexyl peroxydicarbonate (UN No. 2152) in order to check the validity of the 5.0 mm/s criterion. The Federal Republic of Germany will report the test result for the peroxide of UN No. 2172.

Modified Trauzl test (ST/SG/AC.10/C.2/R.483)

14. The test has been withdrawn as a test method for boxes 3 and 4.

The United States Pressure Vessel Test (ST/SG/AC.10/C.2/R.483)

15. The test has been withdrawn as a test method for boxes 3 and 4.

Ignition test (ST/SG/AC.10/C.2/R.494)

16. After a thorough discussion the test was withdrawn because the test does not determine in all cases the subsonic transmission of a decomposition front through a substance without the necessary participation of oxygen from the air (see 11.2.1.(b)).

BOX 5, BOX 9 and BOX 11 of FLOWCHART

17. (1) For all mechanical sensitivity tests the following observations should be recorded as a positive effect: "A report, flame, considerable smoke or complete decomposition of the sample."

(2) Instead of m-dinitrobenzene, the highest available impact energy of the proposed test methods will be used as a criterion between sensitive and insensitive (boxes 9 and 11 of flowchart).

(3) The determination of the friction sensitivity is considered to be unnecessary for the boxes 9 and 11 in the flowchart.

Bureau of explosives, Impact shock test (ST/SG/AC.10/C.2/R.483)

18. The test method was accepted with the following amendments:

The test criteria will be reviewed

The value for the reference substance, isopropyl nitrate will be reported.

Rotter test (ST/SG/AC.10/C.2/R.480)

19. The test method was accepted with the amendment that new test data will be submitted.

ACS test (ST/SG/AC.10/C.2/R.480)

20. The test method has been withdrawn.

BAM Fallhammer test (L.P.1)

21. The test method was accepted with the amendment that the results given in the "EXAMPLES OF RESULTS" will be reviewed according to the agreed definition for a positive."

30 kg Fallhammer test (ST/SG/AC.10/C.2/R.494)

22. Although the test method seems to be less sensitive than the other methods the test was accepted in principle. The test criteria will be adjusted so that the results correspond better with the other methods.

BAM Friction apparatus test (L.P.1)

23. The test method was accepted for box 5 only.

Rotary Friction test (ST/SG/AC.10/C.2/R.480)

24. The test method was accepted for box 5 only.

The test data and test criteria will be reviewed.

BOX 6, BOX 7 and BOX 10 of FLOWCHART

25. The two test methods "US Pressure Vessel test" and "Dutch Pressure Vessel test" could not be combined at this time. The Netherlands will therefore submit a description of the "Dutch Pressure Vessel test".

Koenen test (L.P.1)

26. The test method was accepted with the following remarks:

The filling procedure described in paragraph 4.1 will be reviewed;

The heating rate calibration procedure will be reviewed;

Paragraph 4.4: drawings of examples of fragmentation type, particularly type F, will be added;

The test criteria and test data will be reviewed, in particular those which refer to box 10;

Figure 2A: the explanation of the numbers given in this figure will be added.

Dutch Pressure Vessel test

27. A test description will be submitted.

United States Pressure Vessel test (ST/SG/AC.10/C.2/R.483)

28. The test method was accepted.

Thermal Explosion Vessel test (ST/SG/AC.10/C.2/R.481)

29. The test method has been accepted as a newly developed instrumented test.

A few corrections have to be introduced:

Add the dimensions of the instrument shown in figure 1,

Add a figure showing the standard heating curve,

Report the power of the electrical heater.

The effect of volatile substances has to be studied in more detail.

Low Pressure Autoclave (ST/SG/AC.10/C.2/R.481)

30. The test essentially gives the same result as the Thermal Explosion Vessel test but is more complicated and has therefore been withdrawn.

BOX 8 of FLOWCHART

31. (1) All participants agreed that the term "Explosive power" may be inappropriate and a term related to energy release may be preferable.

(2) It was agreed that further considerations should be given to the type of test necessary for this box.

Ballistic Mortar MKIIId test (ST/SG/AC.10/C.2/R.480)

32. The test was accepted with the following amendments:

Paragraph 4, note 2 will be reviewed,

Paragraph 6, criterion "8.3 no" will be reviewed with subsequent change of criterion "8.2 low".

Ballistic Mortar test (ST/SG/AC.10/C.2/R.494)

33. The test was accepted with the following amendments:

The criterion "no" will be reviewed,

Examples of substances having the result "no" will be added.

Trauzl Lead Block test (L.P.1)

34. The test method was accepted.

Modified Trauzl test (ST/SG/AC.10/C.2/R.483)

35. A revised test description will be submitted.

High Pressure Autoclave (ST/SG/AC.10/C.2/R.514)

36. The test measures the energy content of the test substance and the results will be compared with DTA/DSC values. The test result "no ignition" in the data list will be reviewed.

BOX 12 of FLOWCHART

37. In the introduction to the test methods appropriate for box 12, information about the applicability of the tests in relation to the properties of the substance will be given.

Deflagration test in Package (ST/SG/AC.10/C.2/R.514)

38. The test was accepted with the following amendments:

The type of igniter will be described more accurately;

The test criteria will be reviewed;

The test data will specify the explosion effect in more detail e.g. number of fragments;

The test will be performed in triplicate.

Thermal Explosion test in Package (ST/SG/AC.10/C.2/R.514)

39. The test was accepted with the amendment that the test criteria will be reviewed.

Organic Peroxide Package test (ST/SG/AC.10/C.2/R.483)

40. The test was accepted with the following amendments:

The paragraphs 4.5 and 4.6 will be reviewed so that the test criteria correspond with the answers of box 12;

The results will be adjusted to the modified criteria;

It will be prescribed that the test has to be carried out in duplicate;

The reference to chapter 11 will be updated.

Appendix

BAM 50/60 steel tube test (L.P.1)

Paragraph 4, insert at the end "Two tests are performed unless a detonation is observed".

Paragraph 6, fourth line, for "Partially" read "Partial".

Paragraph 6, twelfth and thirteenth line, delete sentence "In the case ... once".

TNO 50/70 steel tube test (ST/SG/AC.10/C.2/R.481)

Paragraph 4.2, add the sentence "The test is performed in duplicate".

Paragraph 6, second headline, replace "Partial reaction" by "Partial". Amend the paragraph number of the table of examples from "6" to "7".

Detonation test in package (ST/SG/AC.10/C.2/R.514)

Paragraph 4, first line: to the word "substances" a footnote */ is added which reads "For combination packages only one inner package is used which should be the inner package located centrally at the base, while the remainder are (is) filled with inert substance".

Paragraph 4, line 6, between "each" and "100 grams" insert the word "maximum".

Paragraph 4, last line, this sentence is amended to read: "The test is performed in duplicate unless detonation occurs."

Paragraph 7, under the headline packaging insert "Plg; fibredrum, 5 kg" (twice)

Time/pressure test (ST/SG/AC.10/C.2/R.480)

Paragraph 3, last but one sentence, insert after "PVC sheathing" the words "or equivalent"

Deflagration test (ST/SG/AC.10/C.2/R.481)

Paragraph 4, sixth line on page 3, amend the word "heating" by "application of the gas flame".

Paragraph 7, give the following footnote to the UN entry 2116 **: "UN number refers to the technical pure substance." Delete the first single asterisk.

Bureau of Explosives, Impact shock test (ST/SG/AC.10/C.2/R.483)

Paragraph 3.4, line 6, for "definite" read "considerable" and for "extensive" read "complete".

Rotter test (ST/SG/AC.10/C.2/R.480)

Paragraph 2.1, first sentence, delete "in use in the United Kingdom".

Paragraph 2.1, lines 5 and 6, delete the sentence "The test is ... obtained."

BAM Fallhammer test (L.P.1)

Page 2, paragraph 3.2, line 2, "fig. 1" should read "fig. 2".

Koenen test (L.P.1)

Paragraph 3.2, delete "(e.g. material specification ... sheet 1)"

Paragraph 3.3, delete "(e.g. material specification ... 490-52)" (twice).

Paragraph 4.5, change sentence "Now a trial... paragraph 3.3" into "Trials are carried out at increasing diameters according to the sequence given in paragraph 3.3 until only negative results in at least three tests[3/] are obtained at the same level".

Delete "in at least one of at least three single trials[3/]," from the following sentence.

Delete last sentence in paragraph 4.5

United States Pressure Vessel test (ST/SG/AC.10/C.2/R.483)

Paragraph 1.1, this paragraph should read:

"Properties tested

Effects of external heating under defined confinement.

Relevant boxes in flowchart: 6, 7, 10".

Paragraph 1.3, delete first part "The pressure vessel .... in a fume hood."

Paragraph 1.5, last but one line change "1.0" into "1.2" and in the last line "<1.0" into "1.0".

Paragraph 1.6, page 6, change "<1.0" into "1.0" (twice).

Ballistic Mortar MKIIId test (ST/SG/AC.10/C.2/R.480)

Paragraph 4, delete note 1

Ballistic Mortar test (ST/SG/AC.10/C.2/R.494)

In the text the word "shot" will be replaced by "projectile". Same holds for the figures.

Paragraph 3.2, change "firing smoke" into "fumes".

Paragraph 3.2.4, change "Packagings" into "Sample Vessels" (twice).

In paragraph 3.3.3 the word "effort" should read "power" (twice).

Paragraphs 3.3.3, 3.4 and 3.5 for "BME" read "BMP" (six times).

Trauzl Lead Block test (L.P.1)

Fig. 1, item 4 and Fig. 2, item 10, should read "sample charge" (en français "charge de matière").

Deflagration test in Package (ST/SG/AC.10/C.2/R.514)

Paragraph 4, last line, for "duplicate" read "triplicate".

Paragraph 7, footnote, for "fibreboard" read "fibre".

Thermal Explosion test in Package (ST/SG/AC.10/C.2/R.514)

Paragraph 7, footnote for "cardboard" read "fibre" (twice)

Organic Peroxide Package test (ST/SG/AC.10/C.2/R.483)

Delete paragraph 4.5.3.